Conclusions: Our project has identified a large number of pain features that can be assessed when patients have chronic pain after TKR. Standardisation and improvements in assessment is needed to facilitate comparisons of results across studies and the identification, and treatment of patients. This project will move towards standardising assessment through the development of a small core set of pain features to assess in trials focusing on chronic pain after TKR.

718
CONTRALATERAL KNEE EFFECT ON FUNCTIONAL ASSESSMENTS – DATA FROM THE OSTEOARTHRITIS INITIATIVE (OAI)

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Purpose: Treatment of symptomatic knee OA by intra-articular injection is expected to result in improvement of the injected knee. However, the impact of the contra-lateral knee status on functional tests and self-reported knee function is unclear. The purpose of this study was to estimate the sensitivity of functional performance measures, when one of the two knees is successfully treated.

Methods: The two-year (Y2) clinical data from the Osteoarthritis Initiative (OAI, 4796 participants, version 3.2.1) were used. To identify subjects with discordant pain status, we selected OAI participants who fulfilled the following criteria: a) one knee with non-acceptable symptom state (NRS $\geq$ 4; 0–10 = no to worst pain) and frequent (Sx2) or infrequent pain (Sx1) over the past 12 months, b) the contralateral knee without pain (NRS = 0; SX0/1), and c) complete information on age, sex, BMI and KLG (central readings) at Y2 for matching purposes. This selection process resulted in 378 cases with discordant pain. These were compared with OAI participants with bilateral pain-free knees (NRS = 0, Sx 0/1; n = 898 with complete information), to estimate the effect of successfully treating a painful knee in a patient with unilateral knee pain. In 359 of these, one of both pain-free knees was successfully matched to the pain-free knee of the discordant cases by same limb dominance status, KLG (0–1 or 2–4), and sex, age ± 3y, BMI ± 3 kg/m^2. In a next step, discordant cases were compared to OAI participants with bilateral knee pain (NRS$\geq$4; Sx1/2; n = 534 with complete information), to estimate the effect of successfully treating one of both painful knees. In 323 of these, one of both painful knees was successfully matched to the painful knee of the discordant cases, using the same criteria as above. The WOMAC function score (17 items, 0–68, no to severe limitations), the physical activity score of the elderly (PASE; 0–793, least to most active), the chair stands time (5 repeats), 20 m walking, and the 400 m walking test results were compared between the three groups, using paired t-tests. As a measure of effect size, the standardized response mean (SRM = mean/standard deviation [SD] of pairwise differences) was used, to account for the matched pair design.

Results: The sample with discordant pain consisted of 55% women (age 63.9 ± 9.3 y [mean ± SD]; BMI 28.7 ± 4.5) and the demographics were very similar in those with bilaterally painful and pain-free knees. In those with discordant pain status, the WOMAC functional limitation score in the painful knee (11.4 ± 9.6) was significantly higher (p = 4.02E^{-67}) compared to the contralateral pain-free knee (1.2 ± 4.0). The functional limitation score in the matched pain-free knees of bilateral pain-free participants (0.53±1.8) was significantly lower compared to the pain-free knee of the discordant cases (mean pairwise difference −0.71 ± 4.5; 95%CI: [−1.18; −0.24]; p = 0.003). In contrast, the functional limitation score in the matched painful knee of the bilaterally painful participants (16.9 ± 10.8) was significantly higher compared to the painful knee of the discordant cases (mean pairwise difference −5.7 ± 12.9; 95% CI: [−7.1;−4.3]; p = 8.22E^{-14}.
There was no significant difference in the self-assessed PASE between discordant, bilaterally painful and bilaterally pain-free cases (Tables 1 & 2), but there were significant differencme="col6" tnq_colwidth="2*"/ >es in the 20 m and 400 m walking times. The 5 chair stands time discriminated best between the 3 samples.

Table 1
Functional tests: comparison between discordant cases vs. bilaterally painfree cases

	Discordant	Bilat painfree	Mean pair diff		p value	
Test (n =)	***N* = 359**	***n* = 359**	[95% CI]		(paired t)	SRM
PASE (353)	148 ± 73.3	145 ± 80.8	2.3 ± 104	[−8.6; 13.2]	0.679	0.02
Chair stand time (321)	10.6 ± 2.9	9.6 ± 2.3	0.97 ± 3.5	[0.59; 1.36]	9.63E^{-7}	0.28
20 m walk time (346)	15.6 ± 2.9	15.2 ± 2.3	0.38 ± 3.5	[0.01; 0.75]	0.042	0.11
400 m walk time (287)	310 ± 48.2	301 ± 41.6	9.0 ± 57.2	[2.3; 15.6]	0.008	0.16

Table 2
Functional tests: comparison between discordant cases vs. bilaterally painful cases

	Bilat Painful	Discordant	Mean pair diff	p value	
Test (n =)	***N* = 323**	***n* = 323**	[95% CI]	(paired t)	SRM
PASE (316)	151 ± 81.3	149 ± 74	2.2 ± 99 [−8.8; 13.2]	0.693	0.02
Chair stand time (270)	12.0 ± 3.5	10.6 ± 2.8	1.4 ± 4.2 [0.88; 1.90]	1.72E^{-7}	0.33
20 m walk time (306)	16.3 ± 3.3	15.6 ± 2.6	0.70 ± 3.8 [0.26; 1.13]	0.002	0.18
400 m walk time (245)	323 ± 59	308 ± 47	14.6 ± 65.6 [6.3:22.8]	0.001	0.22

Conclusions: Self-assessment of functional limitations in one knee appears to depend on the status of the contralateral knee: In a knee without pain, functional limitation is perceived as more severe when the contralateral knee is painful. In a painful knee, functional limitation is perceived as more severe when the other knee is painful too, compared to the contralateral knee being pain-free. The results suggest that the chair stands time may be the most sensitive in demonstrating functional improvement when pain in (only) one knee is successfully treated. This appears to apply to both unilateral and bilateral baseline knee pain.

719
CHALLENGES TO PARTICIPATION IN ACTIVITY FOLLOWING TOTAL JOINT REPLACEMENT: THE PERSON, THEIR HEALTH AND THEIR SOCIO-CULTURAL CONTEXT

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Purpose: Numerous studies report large and significant improvements in pain, basic mobility and activities of daily living following total hip or knee replacement (TJR) for osteoarthritis (OA). Despite these improvements, quantitative research has shown that there is minimal increase in the frequency of participation in higher demand activities that benefit overall health following TJR. To our knowledge no studies have explored why people do or do not engage in activity following TJR. This study addresses this gap, exploring patients' participation in activities they deem important to their quality of life and health following TJR.
Methods: This paper reports on two years of a three year longitudinal qualitative study. A constructivist approach to grounded theory guided sampling, data collection and analysis. Participants were recruited from the practices of two orthopaedic surgeons using first maximum variation and then theoretical sampling based on age, sex and joint replaced (hip or knee). Open-ended, semi-structured interviews were audio recorded and transcribed verbatim. Data were analyzed using a constant comparison approach and were coded for thematic patterns and relationships from which overarching themes were constructed.
Results: We report findings from the 30 patients (age range: 38 to 79 years; 15 males; 13 TKR) who participated in interviews prior to and 8 months post TJR. We found a high degree of variability with regard to participants' return to activities following surgery and identified five emergent themes that informed this variability. These themes highlight both limitations of surgery and factors beyond the surgery that limit participants' activity following TJR. (1) Losses due to OA prior to surgery: By the time of surgery, most had given up or significantly altered many of their activities to the point that they were no longer a normal part of their daily routines; (2) Limitations of surgery as an intervention: For those who felt their surgery went well, TJR seemed like a "miracle". However, even patients who described their recovery as "good" continued to have some pain and symptoms post TJR. For those who described a poor recovery, their accounts were full of frustration and anguish. These participants felt the experience of TJR left them feeling "half a person"; (3) Issues with multi-morbidities and multiple joints: New symptoms or a heightened awareness of symptoms in other joints such as the back or hip or knee limited participation in activities. For some, other illnesses requiring intervention were also limiting. (4) Socio-cultural context: Participants described a number of socio-contextual factors that may have contributed to their experiences. For example, several participants experienced significant life changes around the time of surgery, including the death of a spouse, relocating to a new home, and financial hardship. Some described pre-existing and emergent mental health issues that were exacerbated by the unanticipated feelings of helplessness immediately following TJR. (5) Fears around the new joint: Many were fearful of damaging their prosthesis and were therefore reluctant to pursue certain activities.
Conclusions: Our findings suggest that multi-faceted experiences impact participation in activity following TJR. As such, there is an urgent need for people to be supported to increase their activity in a way that recognizes the impact of factors beyond the surgical intervention in order to facilitate return to and enhancement of pre-surgery levels of engagement. These factors include changes in identity and lifestyle that preclude a 'return to normal', socio-cultural factors such as loss of spouse or moving cities as well as multi-morbidity and other symptomatic joints. Personalized approaches that focus on being active are critical to promoting healthy aging in people with TJR.

720
ADIPOSITY IS MORE CONSISTENTLY ASSOCIATED WITH INCREASED NON-WEIGHT BEARING THAN WEIGHT-BEARING KNEE PAIN IN OLDER ADULTS: A COHORT STUDY

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Purpose: Obesity is one of the most important risk factors for knee pain in the elderly. Cross sectional studies suggest that body fat mass is associated with knee pain and body lean mass may be protective. Few cohort studies have investigated the association between body fat mass and change in knee pain, particularly knee pain subtypes including weigh-bearing and non-weight-bearing knee pain. Therefore, the aim of this study was to examine the longitudinal relationship between adiposity and change in knee pain over 5.1 years.
Methods: Our study is a prospective, population-based study with 1100 subjects (female 51.1%) aged 50 to 79. Participants were followed up after 2.6 years and 5.1 years. Knee pain was assessed by the Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC). Anthropometrics were measured and body mass index (BMI) was calculated. Body fat, trunk fat and lean mass were measured by dual energy x-ray absorptiometry (DXA). Mixed-effects modelling, log binomial and multinomial logistic regression were utilized to assess the associations between adiposity measures and change in pain after adjustment for age, sex, height (except for BMI) and radiographic osteoarthritis. Missing data in the follow-up were addressed by propensity weighting.
Results: A total of 767 subjects completed the 5.1-years follow-up (retention rate = 69.7%). Compared to those without knee pain (n = 514) at baseline, participants with knee pain (n = 582) have higher values in BMI (28.6 vs 27.1, $p < 0.01$), weight (79.6 vs 75.9 kg, $p < 0.01$), waist circumference (95.8 vs 92.2 cm, $p < 0.01$), body fat percentage (34.9% vs 33.0%, $p < 0.01$) and trunk fat percentage (34.6% vs 32.4%, $p < 0.01$) but lower values in lean mass percentage (62.2% vs 64.0%, $p < 0.01$).
The longitudinal associations between adiposity measures and total knee pain score were assessed using mixed-effects modelling. After adjustment for covariates, total WOMAC score at 3 time points was associated with concurrent BMI (β = 0.21, 95% CI: 0.12, 0.30), waist circumference (β = 0.08, 95% CI: 0.05, 0.11) and total body fat percentage (β = 0.07, 95% CI: 0.01, 0.13), but inversely associated with body lean mass (0 = −0.08, 95% CI: −0.14, −0.02). Trunk fat percentage was also positively associated with total knee pain, but the significance level was at the borderline (β = 0.05, 95% CI: 0.00, 0.10)
Baseline body fat mass and trunk fat mass were associated with consistent knee pain (defined as knee pain at 3 time-points versus no knee pain at 3 time-points) over 5.1 years. One percent increase in body fat mass and trunk fat mass resulted in 1.10-fold and 1.07-fold (both $p < 0.01$) increased risk of consistent knee pain, respectively. In contrast, baseline lean mass was associated with lower risk of consistent knee pain (RR = 0.90, 95% CI: 0.86, 0.94).
After adjustment for covariates, an increase in knee pain over 5.1 years was associated positively with baseline BMI (RR = 1.06, 95% CI: 1.04, 1.09), waist hip ratio (RR = 10.51, 95% CI: 1.43, 76.96), total body fat percentage (RR = 1.05, 95% CI: 1.01, 1.08) and trunk fat percentage (RR = 1.04, 95% CI: 1.01, 1.06), but negatively with total lean mass percentage (RR = 0.95, 95% CI: 0.92, 0.99). In addition, body fat mass and trunk mass were more consistently associated with increases in non-weight-bearing pain subscales including pain when at night while in bed and sitting/lying (Figure 1a) than weight-bearing pain subscales including pain when walking on flat surfaces, going up/down stairs and standing (Figure 1b).
Conclusions: While body mass predicts increased knee pain over 5 years, body and trunk fat are more consistently associated with non-weight-bearing than weight-bearing knee pain, suggesting metabolic mechanisms underlying the association. Increased body lean mass may prevent increased knee pain.